



Patent Office of the People's Republic of China

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Applicant	SUMITOMO MITSUBISHI SILICON CORPORATION			Date of Issue
Agent	China Patent Agent (H.K.) Ltd.			
Patent Application No.	200380107825.3	Application Date	December 25, 2003	July 4, 2008
Title of Invention	SLURRY COMPOSITION FOR CHEMICAL MECHANICAL POLISHING, METHOD FOR PLANARIZATION OF SURFACE OF SEMICONDUCTOR ELEMENT USING THE SAME, AND METHOD			

Second Office Action

1. The examiner has received the Observations, submitted by the applicant on July 17, 2007, and on this basis continued to conduct examination as to substance of the captioned patent application.
 On the basis of the Reexamination Decision made by the Reexamination Board of the Chinese Patent Office on _____, the examiner has continued to conduct examination as to substance of the captioned patent application.

2. the amended document(s) submitted by the applicant on _____ are not in conformity with the provisions of Rule 51.3 of the Implementing Regulations of the Patent Law.

3. Further examination has been conducted in the light of the following application document(s):
 the amended application document(s) attached to the said observations.
 the application document(s) at which the previous Office Action is directed, and the replacement sheet(s) of the amended application document(s) attached to the said Observations.
 the application document(s) at which the previous Office Action is directed.
 the application document(s) confirmed in the said Reexamination Decision.

4. In this Office Action no new reference documents have been cited.
 The following reference document(s) is/are cited in this Office Action. (Its/Their serial number(s) shall come after those previously cited and will continue to be used throughout the examination procedure):

Serial No.	Number or Title(s) of Reference Document(s)	Date of Publication (or filing date of interfering appl.)
1	EP1061111A1	2000-12-20
2	US2002/0110995A1	2002-8-15
3	EP1148538A1	2001-10-24

5. Concluding comments of the examiner:

On the description:

- The amendment to the description is not in conformity with the provision of Art. 33 of the Patent Law.
- The content of the application comes within the scope where no patent right shall be granted as prescribed in Art. 5 of the Patent Law.
- The description is not in conformity with the provision of Art. 26, para. 3 of the Patent Law.
- The drafting of the description is not in conformity with the provision of Rule 18 of the Implementing Regulations.

On the claims:

- The amendment to Claim(s) _____ is not in conformity with the provision of Art. 33 of the Patent Law.
- Claim(s) _____ come(s) within the scope where no patent right shall be granted as prescribed in Art. 25 of the Patent Law.
- Claim(s) _____ is/are not in conformity with the definition of invention in Rule 2, para. 1 of the Implementing Regulations.
- Claim(s) 1-7,9-12 possess(es) no novelty as prescribed in Art. 22, para. 2 of the Patent Law.
- Claim(s) 8,13-17 possess(es) no inventiveness as prescribed in Art. 22, para. 3 of the Patent Law.
- Claim(s) _____ possess(es) no practical applicability as prescribed in Art. 22, para. 4 of the Patent Law.
- Claim(s) _____ is/are not in conformity with the provision of Art. 26, para. 4 of the Patent Law.
- Claim(s) _____ is/are not in conformity with the provision of Art. 31, para. 1 of the Patent Law.
- Claim(s) 3,9,15 is/are not in conformity with the provisions of Rule 20 of the Implementing Regulations.
- Claim(s) _____ is/are not in conformity with the provision of Art. 9 of the Patent Law.
- Claim(s) _____ is/are not in conformity with the provision of Rule 23 of the Implementing Regulations.

See the text portion of this Office Action for a detailed analysis of the above concluding comments.

6. In view of the above concluding comments, the examiner deems that

- the applicant should make amendment to the application document(s) according to the requirements raised in the text portion of this Office Action.
- the applicant should expound in his/its observations the reason why the captioned patent application is patentable and make amendment to what is not in conformity with the provisions as pointed out in the text portion of this Office Action, otherwise the said application will be rejected.
- the patent application has no substantive content(s) for which the patent right may be obtained, if the applicant has no sufficient reason to demonstrate that the captioned application may be granted a patent right, said the application will be rejected.

7. The applicant should pay attention to the following matters:

- (1) According to the provision of Art. 37 of the Patent Law, the applicant should submit his/its observations within two months from the date of receipt of this Office Action; if, without any justified reason(s), the time limit for making a response is not met, the said application shall be deemed to have been withdrawn.
- (2) The amendment(s) made by the applicant to the application should be in conformity with the provisions of Art. 33 of the Patent Law and Rule 51 of the Implementing Regulations thereof, the amended text should be in duplicate and its form should conform to the relevant provisions of the Guidelines for Examination.
- (3) The observations and/or amended text of the applicant should be submitted to the Receiving Section of the Chinese Patent Office by mail or by personal delivery, if not submitted Receiving Section by mail or by personal delivery, the document(s) will have no legal effect.
- (4) If no appointment is made in advance, the applicant and/or the agent shall not come to the Chinese Patent Office to hold an interview with the examiner.

8. This Office Action consists of the text portion totaling 8 page(s) and of the following attachment(s):

3 copy(copies) of the reference document(s) cited totaling 34 page(s).

Appl No: 200380107825.3

Your Ref: OSP-18420(S2945CN-1-JE 海外 522)

Our Ref: CPCH0561974P

Text of the Second Office Action

After studying the observations, the request for correcting the translation errors and the replacement sheets of the amended application documents, on July 17, 2007, the Examiner continues the examination of the present application, and further gives the following comments.

1. The technical solution claimed in independent claim 1 does not possess novelty as stipulated under Article 22, para. 2 of the Chinese Patent Law.

Claim 1 claims a slurry composition for chemical mechanical polishing. Reference document 1 (D1: EP1061111A1) discloses an abrasive composition for polishing a semiconductor device, and specifically discloses (see para. 9-11 and 14-26 in the description therein) that, "by the chemical mechanical polishing technology in the shallow trench isolation process for manufacturing a semiconductor device, the abrasive composition is applied to polish a silicon oxide layer by using a silicon nitride layer as the barrier layer, wherein said abrasive composition comprises ceria particles, water (equivalent to one of the dispersing agents in said claim), a water-soluble organic compound (equivalent to the "anionic additive" in said claim) preferably selected from polyacrylic acid, polymethacrylic acid and the like. The weight ratio between the water-soluble organic compound and ceria is controlled (equivalent to one specific manner of the definition "the anionic additive is added to control a concentration of the anionic additive" in said claim) so that a polishing-rate selection ratio of a silicon oxide layer to a silicon nitride layer is 50 or greater (which discloses the feature "so that a polishing-rate selection ratio of an oxide layer to a nitride layer is 40:1 or greater" therein). It can be seen that D1 has disclosed all the technical features of claim 1. Moreover, said claim and D1 belong to the same technical field of slurry composition for chemical mechanical polishing, solve the same technical problem of improving a polishing-rate selection

ratio of an oxide layer in relation to a nitride layer in the semiconductor technology by the definitions of the components in the slurry composition for polishing and the content thereof, and achieve the same technical effects. Thus the technical solution claimed in said claim possesses no novelty.

2. The technical solution claimed in claim 2 does not possess novelty as stipulated under Article 22, para. 2 of the Chinese Patent Law.

The additional technical feature of claim 2 has been disclosed in D1. D1 discloses (see para. 16 therein) that "the average particle size of the cerium oxide fine powder is from 0.01 to 1.0 μm , preferably from 0.1 to 0.5 μm ". It can be seen that, when claim 1 to which claim 2 refers possesses no novelty, said claim 2 possesses no novelty either.

3. Claim 3 does not conform to Rule 20, para. 1 of the Implementing Regulations of the Chinese Patent Law.

Claim 3 discloses "the ceria polishing particles are polycrystalline particles". Those skilled in the art cannot clearly determine the particle size of the ceria polishing particles wherein the particles in such size are polycrystalline particles. It can be seen the protection scope of said claim 3 is unclear, and the applicant should make amendments.

4. The applicant should note that, if the applicant amends the additional technical feature of claim 3 to "the ceria polishing particles are polycrystalline particles of which grain boundaries are 100 nm or larger" according to the disclosure in the description (see para. 48 in the description thereof), the amended claim 3 does not possess novelty as stipulated under Article 22, para. 2 of the Chinese Patent Law yet. The comments are as follows specifically.

D1 discloses (see para. 16 in the description thereof) that "the average particle size of the cerium oxide fine powder is from 0.01 to 1.0 μm ,

preferably from 0.1 to 0.5 μm ”. However, the range “from 0.1 to 0.5 μm ” falls within the value range of “100 nm or larger”. It can be seen that the additional technical feature of the amended claim 3 has been disclosed in D1. Thus, when claim 1 to which claim 3 refers possesses no novelty, said claim 3 does not possess novelty.

5. The technical solution claimed in claim 4 does not possess novelty as stipulated under Article 22, para. 2 of the Chinese Patent Law.

The additional technical feature of claim 4 has been disclosed in D1. D1 discloses (see para. 19-20 in the description thereof) that “the abrasive composition comprises a water-soluble organic compound, e.g. polyacrylic acid”. It can be seen that, when claim 1 to which claim 4 refers possesses no novelty, said claim 4 does not possess novelty.

6. The technical solution claimed in claim 5 does not possess novelty as stipulated under Article 22, para. 2 of the Chinese Patent Law.

D1 discloses (see para. 42 in the description thereof, and Table 1 therein) that, “as shown in Table 1, the ammonium polyacrylate concentration (equivalent to one of the anionic additives in said claim) is changed. When the ammonium polyacrylate concentration in Sample 3 is 0.2 wt% (which falls within the value range of “0.1-0.6 wt%” in said claim), the polishing-rate selection ratio of the silicon oxide layer to the silicon nitride layer is 64; when the ammonium polyacrylate concentration in Sample 5 is 0.5 wt% (which falls within the value range of “0.1-0.6 wt%” in said claim), the polishing-rate selection ratio of the silicon oxide layer to the silicon nitride layer is 48”. It can be seen that the additional technical feature of claim 5 has been disclosed in D1. Thus, when claim 1 to which claim 5 refers possesses no novelty, said claim 5 does not possess novelty.

7. The technical solution claimed in independent claim 6 does not possess novelty as stipulated under Article 22, para. 2 of the Chinese Patent Law.

Independent claim 6 claims a method for planarizing a surface of a semiconductor device. D1 (EP1061111A1) discloses a method for planarizing a surface in the shallow trench isolation process for manufacturing a semiconductor device, and specifically discloses (see para. 11 and 27-34 in the description thereof, and Fig. 1-3 therein) that, "by the chemical mechanical polishing technology, a shallow trench isolation of the semiconductor device is formed by using an abrasive composition of this invention, wherein said abrasive composition is applied to polish a silicon oxide layer by using a silicon nitride layer as the barrier layer, and said abrasive composition comprises ceria particles, water (equivalent to one of the dispersing agents in said claim), a water-soluble organic compound (equivalent to the "anionic additive" in said claim) preferably selected from polyacrylic acid, polymethacrylic acid and the like. The weight ratio between the water-soluble organic compound and ceria is controlled (equivalent to one specific manner of the definition "the anionic additive is added to control a concentration of the anionic additive" in said claim) so that a polishing-rate selection ratio of a silicon oxide layer to a silicon nitride layer is 50 or greater (which discloses the feature "so that a polishing-rate selection ratio of an oxide layer to a nitride layer is 40:1 or greater" therein). The processing steps for forming the shallow trench isolation comprises, as shown in Fig. 1, forming the trenches 4 (equivalent to one of "the level difference" in said claim) on the surface of the semiconductor substrate such as silicon, forming a silicon nitride layer 3 (equivalent to one of the nitrides in said claim) on an upper level side surface of the trenches 4; as shown in Fig. 2, filling the trenches 4 with the silicon oxide 5 (equivalent to one of the oxides in said claim) to a certain thickness on the silicon nitride layer 3; as shown in Fig. 3, the abrasive composition of this invention is applied to conduct the chemical mechanical polishing process of the silicon oxide 5 to expose the surface of the silicon nitride layer". It can be seen that D1 has disclosed all the technical features of claim 6. Moreover, said claim and D1 belong to the same technical field of the method for planarizing a surface of a semiconductor device, solve the same technical problem of improving a polishing-rate

selection ratio of an oxide layer in relation to a nitride layer in the semiconductor technology by the definitions of the components in the slurry composition for polishing and the content thereof, so as to form the shallow trench isolation structure having better performance, and achieve the same technical effects. Thus the technical solution claimed in said claim possesses no novelty.

8. The technical solution claimed in claim 7 does not possess novelty as stipulated under Article 22, para. 2 of the Chinese Patent Law.

The additional technical feature of claim 7 has been disclosed in D1. D1 discloses (see para. 28 in the description thereof, and Fig. 1 therein) "forming the trenches 4 on the surface of the semiconductor substrate". It can be seen that, when claim 6 to which claim 7 refers possesses no novelty, said claim 7 does not possess novelty.

9. The technical solution claimed in claim 8 does not possess inventiveness as stipulated under Article 22, para. 3 of the Chinese Patent Law.

The additional technical feature of claim 8 is "wherein the method further comprises a step of ablating the oxide layer by a chemical-mechanical-polishing process in which a silica slurry is used before the surface of the nitride layer is exposed". From the technical disclosure in D1 as stated in Comment 6 above, it can be seen that the additional technical feature of claim 8 is the distinguishing feature between said claim 8 and D1. On the basis of said distinguishing feature, it can be determined that the technical problem to be solved by said claim is how to form a shallow trench isolation structure having a planarized surface in a better way.

Reference document 2 (D2: US2002/0110995A1) discloses a method for forming a trench isolation region of a semiconductor device by using a chemical mechanical polishing process, and specifically discloses (see para. 17-41 in the description thereof, and Fig. 1-4 therein) that, "as shown in Fig.

1, trench 150 is formed in a semiconductor substrate 100; the polishing stop patterns 300, preferably silicon nitride layers, are formed on the upper level side surface of the trench 150; as shown in Fig. 2, an insulating layer 400 comprising an silicon oxide is formed on the semiconductor substrate 100 and on the polishing step patterns 300; as shown in Fig. 3, a first CMP process is performed on the insulating layer 400 whereupon a part of the insulating layer 400 is removed, wherein a silicon oxide is used as the abrasive in the polishing slurry used therein; as shown in Fig. 4, a second CMP process is performed to further remove the insulating layer 400 until the upper surface of the polishing step patterns 300 is exposed, wherein the slurry used in the second CMP is a polishing slurry primarily comprising ceria abrasive". From the disclosure above in D2, it can be seen that the distinguishing feature of said claim has been disclosed in D2. Moreover, said disclosure has the same function in D2 of forming a shallow trench isolation structure having a planarized surface in a better way as that of said distinguishing feature in said claim. On the basis of the technical disclosure in D1, those skilled in the art can readily conceive of applying two CMP processes in D2 to D1 and forming a trench isolation region of a semiconductor device by the technical means of "firstly polishing with the silicon oxide slurry, and then with the ceria-containing polishing slurry disclosed in D1 to planarize the surface of the semiconductor device. On the basis of D1 in combination with D2, those skilled in the art can obviously obtain the technical solution claimed in said claim. Thus the technical solution claimed in said claim possesses no prominent substantive features or notable progress, and possesses no inventiveness.

10. Claim 9 does not conform to Rule 20, para. 1 of the Implementing Regulations of the Chinese Patent Law.

Claim 9 discloses "the ceria polishing particles are polycrystalline particles". Those skilled in the art cannot clearly determine the particle size of the ceria polishing particles wherein the particles in such size are polycrystalline particles. It can be seen the protection scope of said claim 9 is unclear, and

the applicant should make amendments.

11. The applicant should note that, if the applicant amends the additional technical feature of claim 9 to “the ceria polishing particles are polycrystalline particles of which grain boundaries are 100 nm or larger” according to the disclosure in the description (see para. 48 in the description thereof), the amended claim 9 does not possess novelty as stipulated under Article 22, para. 2 of the Chinese Patent Law yet. The comments are as follows specifically.

D1 discloses (see para. 16 in the description thereof) that “the average particle size of the cerium oxide fine powder is from 0.01 to 1.0 μm , preferably from 0.1 to 0.5 μm ”. However, the range “from 0.1 to 0.5 μm ” falls within the value range of “100 nm or larger”. It can be seen that the additional technical feature of the amended claim 9 has been disclosed in D1. Thus, when claim 6 to which claim 9 refers possesses no novelty, said claim 9 does not possess novelty.

12. The technical solution claimed in claim 10 does not possess novelty as stipulated under Article 22, para. 2 of the Chinese Patent Law.

The additional technical feature of claim 10 has been disclosed in D1. D1 discloses (see para. 19-20 in the description thereof) that “the abrasive composition comprises a water-soluble organic compound, e.g. polyacrylic acid”. It can be seen that, when claim 6 to which claim 10 refers possesses no novelty, said claim 10 does not possess novelty.

13. The technical solution claimed in claim 11 does not possess novelty as stipulated under Article 22, para. 2 of the Chinese Patent Law.

D1 discloses (see para. 42 in the description thereof, and Table 1 therein) that, “as shown in Table 1, the ammonium polyacrylate concentration (equivalent to one of the anionic additive in said claim) is changed. When the ammonium

polyacrylate concentration in Sample 3 is 0.2 wt% (which falls within the value range of “0.1-0.6 wt%” in said claim), the polishing-rate selection ratio of the silicon oxide layer to the silicon nitride layer is 64; when the ammonium polyacrylate concentration in Sample 5 is 0.5 wt% (which falls within the value range of “0.1-0.6 wt%” in said claim), the polishing-rate selection ratio of the silicon oxide layer to the silicon nitride layer is 48”. It can be seen that the additional technical feature of claim 11 has been disclosed in D1. Thus, when claim 6 to which claim 11 refers possesses no novelty, said claim 11 does not possess novelty.

14. The technical solution claimed in claim 12 does not possess novelty as stipulated under Article 22, para. 2 of the Chinese Patent Law.

The additional technical feature of claim 12 has been disclosed in D1. D1 discloses that “the processing steps for forming the shallow trench isolation comprises, as shown in Fig. 1, forming the trenches 4 (equivalent to one of “the level difference” in said claim) on the surface of the semiconductor substrate such as silicon, forming a silicon nitride layer 3 on an upper level side surface of the trenches 4; as shown in Fig. 2, filling the trenches 4 with the silicon oxide 5 to a certain thickness on the silicon nitride layer 3”. It can be seen that, when claim 6 to which claim 12 refers possesses no novelty, said claim 12 does not possess novelty either.

15. The technical solution claimed in independent claim 13 does not possess inventiveness as stipulated under Article 22, para. 3 of the Chinese Patent Law.

Claim 13 claims a method for controlling a selection ratio of a chemical-mechanical-polishing slurry composition. D1 (EP1061111A1) discloses (see para. 14-26 and 42 and Table 1 in the description thereof) that, “by the chemical mechanical polishing technology in the shallow trench isolation process for manufacturing a semiconductor device, the abrasive composition is applied to polish a silicon oxide layer by using a silicon

nitride layer as the barrier layer, wherein said abrasive composition comprises ceria particles, water (equivalent to one of the dispersing agents in said claim), a water-soluble organic compound (equivalent to the "anionic additive" in said claim) preferably selected from polyacrylic acid, polymethacrylic acid and the like. As shown in Table 1, the ammonium polyacrylate concentration (equivalent to one of the anionic additives in said claim) is changed. Different ammonium polyacrylate concentrations correspond to the result of the polishing-rate selection ratio of different silicon oxide layers (equivalent to one of the oxides in said claim) to silicon nitride layers (equivalent to one of the "nitrides" in said claim). It can be seen that claim 13 differs from D1 in "a step of adjusting the concentration of the anionic additive to attain a desired selection ratio of the slurry composition, on the basis of the confirmed polishing-rate selection ratio, thereby controlling the selection ratio of the slurry composition". On the basis of said distinguishing feature, it can be determined that the technical problem to be solved by said claim is how to control the selection ratio of the slurry composition. Under the circumstance that different ammonium polyacrylate concentrations (equivalent to one of the anionic additives in said claim) and the polishing-rate selection ratio of the corresponding silicon oxide layer (one of the oxides in said claim) to silicon nitride layer (one of the "nitrides" in said claim) are known, those skilled in the art can adjust the concentration of the anionic additive such as ammonium polyacrylates to attain a desired selection ratio of the slurry composition in the actual process according to the coincidence relation above and the technical disclosure contained in D1, which is the common technical means in the technological process and the common knowledge in the art. On the basis of D1 in combination with the common knowledge in the art, those skilled in the art can obviously obtain the technical solution claimed in said claim. Thus the technical solution claimed in said claim possesses no prominent substantive features or notable progress, and possesses no inventiveness.

16. The technical solution claimed in claim 14 does not possess inventiveness as stipulated under Article 22, para. 3 of the Chinese Patent Law.

Claim 14 claims a method for controlling a selection ratio of a chemical-mechanical-polishing slurry composition. Reference document 3 (D3: EP1148538A1) (see para. 14, 20, 43-52, and Tables 1-1 and 1-2 in the description thereof) discloses "a chemical mechanical polishing slurry composition comprising ceria polishing particles, water (equivalent to one of the dispersing agents in said claim), a liquid additive containing a polymer dispersant (equivalent to the anionic additive in said claim) such as polycarboxylic acid, polyacrylic acid and the like. As shown in Tables 1-1 and 1-2, the polishing-rate selection ratio of different silicon oxide layers (equivalent to one of the oxides in said claim) and silicon nitride layers (equivalent to one of the "nitrides" in said claim) by changing the size of the ceria polishing particle in the samples and the concentration of the dispersant (equivalent to the anionic additive in said claim) in the liquid additive". It can be seen that said claim differs from D3 in "a step of adjusting the concentration of the anionic additive to attain a desired selection ratio of the slurry composition, on the basis of the confirmed polishing-rate selection ratio, thereby controlling the selection ratio of the slurry composition". On the basis of said distinguishing feature, it can be determined that the technical problem to be solved by said claim is how to control the selection ratio of the slurry composition. As for those skilled in the art, D3 has disclosed in Tables 1-1 and 1-2 that the dispersants in different concentrations correspond to the polishing-rate selection ratio of different silicon oxide layers (equivalent to one of the oxides in said claim) and silicon nitride layers (equivalent to one of the "nitrides" in said claim). According to the coincidence relation above, those skilled in the art can adjust the selection ratio of the slurry composition by changing the concentration of the dispersant to attain a desired selection ratio of the slurry composition in the actual process, which is the common technical means in the technological process and the common knowledge in the art. On the basis of D1 in combination with the common knowledge in the art, those skilled in the art can obviously obtain the technical solution claimed in said claim. Thus the technical solution claimed in said claim possesses no prominent substantive features or notable progress, and

possesses no inventiveness.

17. Claim 15 does not conform to Rule 20, para. 1 of the Implementing Regulations of the Chinese Patent Law.

Claim 15 discloses "the ceria polishing particles are polycrystalline particles". Those skilled in the art cannot clearly determine the particle size of the ceria polishing particles wherein the particles in such size are polycrystalline particles. It can be seen the protection scope of said claim 15 is unclear, and the applicant should make amendments.

18. The applicant should note that, if the applicant amends the additional technical feature of claim 15 to "the ceria polishing particles are polycrystalline particles of which grain boundaries are 100 nm or larger" according to the disclosure in the description (see para. 48 in the description thereof), the amended claim 15 does not possess inventiveness as stipulated under Article 22, para. 3 of the Chinese Patent Law yet. The comments are as follows specifically.

D1 discloses (see para. 16 in the description thereof) that "the average particle size of the cerium oxide fine powder is from 0.01 to 1.0 μm , preferably from 0.1 to 0.5 μm ". However, the range "from 0.1 to 0.5 μm " falls within the value range of "100 nm or larger". It can be seen that the additional technical feature of the amended claim 15 has been disclosed in D1. Thus, when claim 13 to which claim 15 refers possesses no inventiveness, said claim 15 does not possess inventiveness either.

19. The technical solution claimed in claim 16 does not possess inventiveness as stipulated under Article 22, para. 3 of the Chinese Patent Law.

The additional technical feature of claim 16 has been disclosed in D1. D1 discloses (see para. 19-20 in the description thereof) that "the abrasive composition comprises a water-soluble organic compound, e.g. polyacrylic

acid". It can be seen that, when claim 13 to which claim 16 refers possesses no inventiveness, said claim 16 does not possess inventiveness either.

20. The technical solution claimed in claim 17 does not possess inventiveness as stipulated under Article 22, para. 3 of the Chinese Patent Law.

D1 discloses (see para. 42 in the description thereof, and Table 1 therein) that, "as shown in Table 1, the ammonium polyacrylate concentration (equivalent to one of the anionic additive in said claim) is changed so as to correspond to the polishing-rate selection ratio of different silicon oxide layers to silicon nitride layers. The ammonium polyacrylate concentrations in different samples in Table 1 include 0.2 wt% and 0.5 wt%, which both fall within the value range of "0.1-0.6 wt%". On the basis of the concentration value disclosed in D1, those skilled in the art can easily conceive of extending the concentration range to "0.1-0.6 wt%" so as to determine the polishing-rate selection ratio of different silicon oxide layers to silicon nitride layers via the change of the concentration. It can be seen that, when claim 13 to which claim 17 refers possesses no inventiveness, said claim 17 does not possess inventiveness either.

For the aforesaid reasons, neither independent claims nor dependent claims of the present application possess novelty or inventiveness. Meanwhile, the description does not disclose any other substantive contents which can be granted a patent right. Therefore, even if the applicant reorganises the claims and/or makes further definitions according to the disclosure contained in the description, the present application is unlikely to be granted a patent right. If, within the time limit fixed in this Office Action, the applicant fails to put forward any sufficient reasons to show that the present application possesses novelty or inventiveness, the present application will be rejected.



中华人民共和国国家知识产权局

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北京市西城区金融街 27 号投资广场 B 座 19 层
中国专利代理(香港)有限公司
郭煜,段晓玲

发文日



申请号: 2003801078253



申请人: 三菱住友硅晶株式会社, 学校法人汉阳学院

发明名称: 化学机械研磨用浆料组合物、利用它的半导体元件的表面平坦化方法以及浆料组合物的选择比控制方法

第 2 次审查意见通知书

0561974P

1. 审查员已收到申请人于 2007 年 7 月 17 日提交的意见陈述书, 在此基础上审查员对上述专利申请继续进行实质审查。

根据国家知识产权局专利复审委员会于 年 月 日作出的复审决定, 审查员对上述专利申请继续实质审查。



2. 申请人于 年 月 日提交的修改文件, 不符合专利法实施细则第 51 条第 3 款的规定。

3. 继续审查是针对下述申请文件进行的:

上述意见陈述书中所附的经修改的申请文件。

前次审查意见通知书所针对的申请文件以及上述意见陈述书中所附的经修改的申请文件替换页。

前次审查意见通知书所针对的申请文件。

上述复审决定所确定的申请文件。



4. 本通知书未引用新的对比文件。

本通知书引用下述对比文件(其编号续前, 并在今后的审查过程中继续沿用):

编号	文件号或名称	公开日期(或抵触申请的申请日)
1	EP1061111A1	2000-12-20
2	US2002/0110995A1	2002-8-15
3	EP1148538A1	2001-10-24

19 SEP 2008

5. 审查的结论性意见:

关于说明书:

申请的内容属于专利法第 5 条规定的不授予专利权的范围。

说明书不符合专利法第 26 条第 3 款的规定。

说明书的修改不符合专利法第 33 条的规定。

说明书的撰写不符合专利法实施细则第 18 条的规定。



关于权利要求书:

权利要求 1-7, 9-12 不具备专利法第 22 条第 2 款规定的新颖性。

权利要求 8, 13-17 不具备专利法第 22 条第 3 款规定的创造性。

权利要求 不具备专利法第 22 条第 4 款规定的实用性。

权利要求 属于专利法第 25 条规定的不授予专利权的范围。

权利要求 不符合专利法第 26 条第 4 款的规定。

权利要求 不符合专利法第 31 条第 1 款的规定。

权利要求 的修改不符合专利法第 33 条的规定。

21303
2006.7

回函请寄: 100088 北京市海淀区蔚蓝门桥西土城路 6 号 国家知识产权局专利局受理处收
(注: 凡寄给审查员个人的信函不具有法律效力)

申请号 2003801078253

- 权利要求 _____ 不符合专利法实施细则第 2 条第 1 款的规定。
 权利要求 _____ 不符合专利法实施细则第 13 条第 1 款的规定。
 权利要求 3, 9, 15 不符合专利法实施细则第 20 条的规定。
 权利要求 _____ 不符合专利法实施细则第 21 条的规定。
 权利要求 _____ 不符合专利法实施细则第 22 条的规定。
 权利要求 _____ 不符合专利法实施细则第 23 条的规定。

 分案的申请不符合专利法实施细则第 43 条第 1 款的规定。

上述结论性意见的具体分析见本通知书的正文部分。

6. 基于上述结论性意见，审查员认为：

- 申请人应按照通知书正文部分提出的要求，对申请文件进行修改。
 申请人应在意见陈述书中论述其专利申请可以被授予专利权的理由，并对通知书正文部分中指出的不符合规定之处进行修改，否则将不能授予专利权。
 专利申请中没有可以被授予专利权的实质性内容，如果申请人没有陈述理由或者陈述理由不充分，其申请将被驳回。

7. 申请人应注意下述事项：

- (1) 根据专利法第 37 条的规定，申请人应在收到本通知书之日起的贰个月内陈述意见，如果申请人无正当理由逾期不答复，其申请将被视为撤回。
(2) 申请人对其申请的修改应符合专利法第 33 条和实施细则第 51 条的规定，修改文本应一式两份，其格式应符合审查指南的有关规定。
(3) 申请人的意见陈述书和/或修改文本应邮寄或递交国家知识产权局专利局受理处，凡未邮寄或递交给受理处的文件不具备法律效力。
(4) 未经预约，申请人和/或代理人不得前来国家知识产权局专利局与审查员举行会晤。

8. 本通知书正文部分共有 8 页，并附有下述附件：

- 引用的对比文件的复印件共 3 份 34 页。

审查员：戴丽娟 (A728)



2008 年 6 月 2 日

审查部门 电学发明审查部

21303
2006.7



回函请寄：100088 北京市海淀区蔚山路 6 号 国家知识产权局专利局受理处收
(注：凡寄给审查员个人的信函不具有法律效力)

第二 次 审 查 意 见 通 知 书 正 文

申请号：2003801078253

申请人于2007年7月17日提交了意见陈述书、改正译文错误请求书和经过修改的申请文件替换页，审查员在阅读了上述文件后，对该申请继续进行审查，再次提出如下审查意见。

1. 独立权利要求1所要求保护的技术方案不具备专利法第22条第2款规定的新颖性。

权利要求1要求保护一种化学机械研磨用浆料组合物，对比文件1 (EP1061111A1) 公开了一种用于研磨半导体器件的研磨组成物，具体公开了如下技术特征（参见说明书第9至11段和第14至26段）：“在制备半导体器件的浅沟槽隔离工艺中利用化学机械研磨技术，用一种研磨组合物以氮化硅层作为阻挡层对氧化硅层进行研磨，该研磨组合物包括氧化铈粒子，水（相当于该权利要求中分散剂的一种），水溶性有机化合物（相当于该权利要求中“阴离子性添加剂”），水溶性有机化合物优选为聚丙烯酸、聚甲基丙烯酸等。控制水溶性有机化合物与氧化铈的重量比（相当于该权利要求中“控制阴离子性添加剂的浓度”的一种具体方式），使得氧化硅层和氮化硅层的研磨速度选择比达到50或更高（公开了该权利要求的技术特征“使得上述氧化物层对上述氮化物层的研磨速度的选择比为40：1以上”）。由此可见，权利要求1的所有技术特征都已经被对比文件1公开，两者用于相同的技术领域，即化学机械研磨用浆料组合物；所解决的技术问题相同，都是通过研磨浆料组成物的成份和含量的限定提高半导体工艺中氧化物层对氮化物层的研磨速度选择比，达到了相同的技术效果。因此，该权利要求所要求保护的技术方案不具备新颖性。

2. 权利要求2所要求保护的技术方案不具备专利法第22条第2款规定的新颖性。

权利要求2的附加技术特征已经被对比文件1公开（参见说明书第16段）“氧化铈粒子的粒子平均尺寸为0.01到1.0 μm ，优选为0.1到0.5 μm ”，因此，在其引用的权利要求1不具备新颖性的情况下，该权利要求也不具备新颖性。

3. 权利要求3不符合专利法实施细则第20条第1款的规定。

权利要求3记载了“上述氧化铈研磨粒子是多结晶粒子”，而本领域技术人员无法清楚地确定粒子氧化铈粒子中粒子尺寸为多大时称为多结晶粒子，因此，该权利要求的保护范围是不清楚的，申请人应当对此进行修改。

4. 请申请人注意，如果申请人根据说明书记载的内容（参见说明书第10页第9至12

行), 将权利要求3的附加技术特征修改为“上述氧化铈研磨粒子是具有大小为100nm以上的晶界的多结晶粒子”, 修改后的权利要求3仍将不具备专利法第22条第2款规定的新颖性。具体评述如下:

对比文件1记载了(参见说明书第16段)“氧化铈粒子的粒子平均尺寸为0.01到1.0 μm , 优选为0.1到0.5 μm ”, 而“0.1到0.5 μm ”落在了“100nm以上”的数值范围中。因此, 修改后的权利要求3的附加技术特征已经被对比文件1公开, 在其引用的权利要求1不具备新颖性的情况下, 该权利要求也将不具备新颖性。

5. 权利要求4所要求保护的技术方案不具备专利法第22条第2款规定的新颖性。

权利要求4的附加技术特征已经被对比文件1公开(参见说明书第19至20段)“研磨组合物包括水溶性有机化合物, 例如聚丙烯酸”, 由此可见, 在其引用的权利要求1不具备新颖性的情况下, 该权利要求也不具备新颖性。

6. 权利要求5所要求保护的技术方案不具备专利法第22条第2款规定的新颖性。

对比文件1公开了(参见说明书42段、表1): “如表1, 改变聚丙烯酸铵(相当于该权利要求中阴离子添加剂的一种)的浓度, 样品3中聚丙烯酸铵的浓度为0.2重量%时(“0.2重量%”落在了该权利要求的数值范围“0.1~0.6重量%”之中), 氧化硅层和氮化硅层的研磨速度选择比为64, 样品5中聚丙烯酸铵的浓度为0.5重量%时(“0.5重量%”落在了该权利要求的数值范围“0.1~0.6重量%”之中), 氧化硅层和氮化硅层的研磨速度选择比为48”由此可见, 该权利要求的附加技术特征已经被对比文件1公开。因此, 在其引用的权利要求1不具备新颖性的情况下, 该权利要求也不具备新颖性。

7. 独立权利要求6所要求保护的技术方案不具备专利法第22条第2款规定的新颖性。

独立权利要求6要求保护一种半导体元件的表面平坦化方法, 对比文件1(EP1061111A1)公开了一种在制备半导体器件的浅沟槽隔离工艺中的表面平坦化方法, 具体公开了如下技术特征(参见说明书第11段, 第27至34段、图1至3): “使用该发明的研磨组成物通过例如化学机械研磨的研磨工艺形成半导体器件的浅沟槽隔离, 该研磨组成物以氮化硅层作为阻挡层对氧化硅层进行研磨, 该研磨组合物包括氧化铈粒子, 水(相当于该权利要求中分散剂的一种), 水溶性有机化合物(相当于该权利要求中“阴离子性添加剂”), 水溶性有机化合物优选为聚丙烯酸、聚甲基丙烯酸等。控制水溶性有机化合物与氧化铈的重量比(相当于该权利要求中“控制阴离子性添加剂的浓度”的一种具体方式), 使得氧化硅层和氮化硅层的研磨速度选择比达到50或更高

(公开了该权利要求的技术特征“使得上述氧化物层对上述氮化物层的研磨速度的选择比为40：1以上）。形成浅沟槽隔离的工艺步骤包括：如图1所示，在例如硅的半导体衬底的表面形成有沟槽4（相当于该权利要求中的“台阶高差”的一种），沟槽4的上位侧表面形成有氮化硅层3（相当于该权利要求中氮化物的一种），如图2所示，将氧化硅5（相当于该权利要求中的氧化物的一种）填埋在沟槽4中并形成在氮化硅层3上一定厚度，如图3所示，用该发明上述的研磨组成物对氧化硅5进行如化学机械研磨的研磨工艺，直到氮化硅层的表面露出。”由此可见，权利要求6的所有技术特征都已经被对比文件1公开，两者用于相同的技术领域，即半导体器件的表面平坦化方法；所解决的技术问题相同，都是通过研磨浆料组成物的成份和含量的限定提高半导体工艺中氧化物层对氮化物层的研磨速度选择比，从而形成性能好的浅沟槽隔离结构，达到了相同的技术效果。因此，该权利要求所要求保护的技术方案不具备新颖性。

8. 权利要求7所要求保护的技术方案不具备专利法第22条第2款规定的新颖性。

权利要求7的附加技术特征已经被对比文件1公开（参见说明书第28段、图1）：“在半导体衬底的表面形成有沟槽4”，因此，在其引用的权利要求6不具备新颖性的情况下，该权利要求也不具备新颖性。

9. 权利要求8所要求保护的技术方案不具备专利法第22条第3款规定的创造性。

权利要求8的附加技术特征为“进而具有在上述氮化物层的表面出之前，使用具有在上述氮化物层的表面露出之前，使用氧化硅浆料，用化学机械研磨工序除去上述氧化物层的步骤”。由审查意见6中有关对比文件1公开的技术内容可知，权利要求8的附加技术特征也就是权利要求8与对比文件1的区别特征。基于上述区别特征可以确定，该权利要求所要解决的技术问题是如何更好地形成表面平坦化的浅沟槽隔离结构。

对比文件2（US2002/0110995A1）公开了一种通过化学机械研磨方法形成半导体器件沟槽隔离区域的方法，具体公开了如下技术特征（参见说明书第17段至第41段、附图1至4）：“如图1所示，在半导体衬底100上形成有沟槽150，沟槽150的上位侧表面形成有研磨阻挡图案层300，优选为氮化硅层。如图2所示，由氧化硅构成的绝缘层400形成在沟槽150中以及研磨阻挡图案层300之上，如图3所示，通过第一次化学机械研磨工艺除去绝缘层400的一部分，所用的研磨浆料以氧化硅为研磨剂，如图4所示，接着进行第二次化学机械研磨工艺进一步除去绝缘层400直到研磨阻挡图案层300的上表面露出，第二次化学机械研磨工艺用的浆料是以氧化铈研磨剂为主的研磨浆料。”，

由对比文件2公开的上述内容可知，该权利要求的区别特征已经被对比文件2公开，且上述内容在对比文件2中所起的作用和上述区别特征在该权利要求中所起的作用相同，都是为了更好地形成表面平坦化的浅沟槽隔离结构。因此，在对比文件1公开的技术内容的基础上，本领域技术人员很容易想到将对比文件2公开的两次化学机械研磨的方法应用到对比文件1中采用“首先用氧化硅浆料进行研磨，接着用对比文件1公开的包含氧化铈的研磨浆料进行研磨使半导体器件表面平坦化”的技术手段形成半导体器件的沟槽隔离区域，由此可见，在对比文件1的基础上结合对比文件2得到该权利要求所要求保护的技术方案对本领域技术人员而言是显而易见的，该权利要求所要求保护的技术方案不具备突出的实质性特点和显著的进步，不具备创造性。

10. 权利要求9不符合专利法实施细则第20条第1款的规定。

权利要求9记载了“上述氧化铈研磨粒子是多结晶粒子”，而本领域技术人员无法清楚地确定粒子氧化铈粒子中粒子尺寸为多大时称为多结晶粒子，因此，该权利要求的保护范围是不清楚的，申请人应当对此进行修改。

11. 请申请人注意，如果申请人根据说明书记载的内容（参见说明书第10页第9至12行），将权利要求9的附加技术特征修改为“上述氧化铈研磨粒子是具有大小为100nm以上的晶界的多结晶粒子”，修改后的权利要求9仍将不具备专利法第22条第2款规定的新颖性。具体评述如下：

对比文件1记载了（参见说明书第16段）“氧化铈粒子的粒子平均尺寸为0.01到1.0 μm ，优选为0.1到0.5 μm ”，而“0.1到0.5 μm ”落在了“100nm以上”的数值范围内。因此，修改后的权利要求9的附加技术特征已经被对比文件1公开，在其引用的权利要求6不具备新颖性的情况下，该权利要求也将不具备新颖性。

12. 权利要求10所要求保护的技术方案不具备专利法第22条第2款规定的新颖性。

权利要求10的附加技术特征已经被对比文件1公开（参见说明书第19至20段）“研磨组合物包括水溶性有机化合物，例如聚丙烯酸”，由此可见，在其引用的权利要求6不具备新颖性的情况下，该权利要求也不具备新颖性。

13. 权利要求11所要求保护的技术方案不具备专利法第22条第2款规定的新颖性。

对比文件1公开了（参见说明书42段、表1）：“如表1，改变聚丙烯酸铵（相当于该权利要求中阴离子添加剂的一种）的浓度，样品3中聚丙烯酸铵的浓度为0.2重量%时（“0.2重量%”落在了该权利要求的数值范围“0.1~0.6重量%”之中），氧化硅层和氮

化硅层的研磨速度选择比为64，样品5中聚丙烯酸铵的浓度为0.5重量%时（“0.5重量%”落在了该权利要求的数值范围“0.1～0.6重量%”之中），氧化硅层和氮化硅层的研磨速度选择比为48”，由此可见，该权利要求的附加技术特征已经被对比文件1公开。因此，在其引用的权利要求6不具备新颖性的情况下，该权利要求也不具备新颖性。

14. 权利要求12所要求保护的技术方案不具备专利法第22条第2款规定的新颖性。

权利要求12的附加技术特征已经被对比文件1公开“形成浅沟槽隔离的工艺步骤包括：如图1所示，再例如硅的半导体衬底的表面形成有沟槽4（相当于该权利要求中的“台阶高差”的一种），沟槽4的上位侧表面形成有氮化硅层3，如图2所示，将氧化硅5填埋在沟槽4中并形成在氮化硅层3上一定厚度。”，由此可见，在其引用的权利要求6不具备新颖性的情况下，该权利要求也不具备新颖性。

15. 独立权利要求13所要求保护的技术方案不具备专利法第22条第3款规定的创造性。

权利要求13要求保护一种化学机械研磨用浆料组合物的选择比控制方法，对比文件1（EP1061111A1）公开了如下技术特征（参见说明书第14至26段，第42段、表1）：“在制备半导体器件的浅沟槽隔离工艺中利用化学机械研磨技术，用一种研磨组合物以氮化硅层作为阻挡层对氧化硅层进行研磨，该研磨组合物包括氧化铈粒子，水（相当于该权利要求中分散剂的一种），水溶性有机化合物(相当于该权利要求中“阴离子性添加剂”），水溶性有机化合物优选为聚丙烯酸、聚甲基丙烯酸等。如表1所示，改变聚丙烯酸铵（相当于该权利要求中阴离子添加剂的一种）的浓度，与不同聚丙烯酸铵浓度对应的是不同的氧化硅层（该权利要求中氧化物的一种）和氮化硅（该权利要求中“氮化物”的一种）层的研磨速度选择比的结果。”由此可见，权利要求13和对比文件1的区别在于“以上述确认了的研磨速度的选择比为基准，通过添加上述阴离子添加剂的浓度使得上述浆料组合物具有希望的选择比，来控制上述浆料组合物的选择比的步骤”，基于上述区别特征可以确定，该权利要求所要解决的技术问题是如何控制浆料组合物的选择比。对本领域技术人员而言，根据对比文件1公开的技术内容，在已知不同的聚丙烯酸铵浓度（相当于该权利要求中阴离子添加剂的一种）和对应的氧化硅层（该权利要求中氧化物的一种）和氮化硅（该权利要求中“氮化物”的一种）层的研磨速度选择比的情况下，本领域技术人员根据上述的对应关系通过改变例如聚丙烯酸铵的阴离子添加剂的浓度来控制浆料组合物的选择比使之成为实际工艺中希望

的选择比，是本领域技术人员在工艺过程中常用的技术手段，属于本领域的公知常识。因此，在对比文件1公开的内容的基础上结合本领域的公知常识得到该权利要求所要求保护的技术方案对本领域技术人员而言是显而易见的，该权利要求所要求保护的技术方案不具备突出的实质性特点和显著的进步，不具备创造性。

16. 权利要求14所要求保护的技术方案不具备专利法第22条第3款规定的创造性。

权利要求14要求保护一种化学机械研磨用浆料组合物的选择比控制方法，对比文件3（EP1148538A1）公开了（参见说明书第14段，第20段，第43至52段、表1-1和表1-2）“一种化学机械研磨用浆料组合物，包括氧化铈研磨粒子，水（相当于该权利要求中分散剂的一种），液体添加剂，液体添加剂包括聚合体的分散剂（相当于该权利要求中的阴离子添加剂），例如聚羧酸、聚丙烯酸等。如表1-1和表1-2所示，通过改变样品的氧化铈研磨粒子的大小和液体添加剂中分散剂（相当于该权利要求中的阴离子添加剂）的浓度，得到不同的氧化硅层（该权利要求中氧化物的一种）和氮化硅（该权利要求中“氮化物”的一种）层的研磨速度选择比”，由此可见，该权利要求与对比文件3的区别在于“以上述确认了的研磨速度的选择比为基准，通过添加上述阴离子添加剂的浓度使得上述浆料组合物具有希望的选择比，来控制上述浆料组合物的选择比的步骤”，基于上述区别特征可以确定，该权利要求所要解决的技术问题是如何控制浆料组合物的选择比。对本领域技术人员而言，对比文件3表1-1和表1-2中已经公开了不同浓度的分散剂对应不同的氧化硅层（该权利要求中氧化物的一种）和氮化硅（该权利要求中“氮化物”的一种）层的研磨速度选择比，本领域技术人员根据上述的对应关系通过改变分散剂的浓度来控制浆料组合物的选择比使之成为实际工艺中希望的选择比，是本领域技术人员在工艺过程中常用的技术手段，属于本领域的公知常识。因此，在对比文件3的基础上结合本领域的公知常识得到该权利要求所要求保护的技术方案对本领域技术人员而言是显而易见的，该权利要求所要求保护的技术方案不具备突出的实质性特点和显著的进步，不具备创造性。

17. 权利要求15不符合专利法实施细则第20条第1款的规定。

权利要求15记载了“上述氧化铈研磨粒子是多结晶粒子”，而本领域技术人员无法清楚地确定粒子氧化铈粒子中粒子尺寸为多大时称为多结晶粒子，因此，该权利要求的保护范围是不清楚的，申请人应当对此进行修改。

18. 请申请人注意，如果申请人根据说明书记载的内容（参见说明书第10页第9至12

行），将权利要求15的附加技术特征修改为“上述氧化铈研磨粒子是具有大小为100nm以上的晶界的多结晶粒子”，修改后的权利要求15仍将不具备专利法第22条第3款规定的创造性。具体评述如下：

对比文件1记载了（参见说明书第16段）“氧化铈粒子的粒子平均尺寸为0.01到1.0 μm，优选为0.1到0.5 μm”，而“0.1到0.5 μm”落在了“100nm以上”的数值范围内。因此，修改后的权利要求15的附加技术特征已经被对比文件1公开，在其引用的权利要求13不具备创造性的情况下，该权利要求也将不具备创造性。

19. 权利要求16所要求保护的技术方案不具备专利法第22条第3款规定的创造性。

权利要求16的附加技术特征已经被对比文件1公开（参见说明书第19至20段）“研磨组合物包括水溶性有机化合物，例如聚丙烯酸”，由此可见，在其引用的权利要求13不具备创造性的情况下，该权利要求也不具备创造性。

20. 权利要求17所要求保护的技术方案不具备专利法第22条第3款规定的创造性。

对比文件1公开了（参见说明书42段、表1）：“如表1，改变聚丙烯酸铵（相当于该权利要求中阴离子添加剂的一种）的浓度，对应不同的氧化硅层和氮化硅层的研磨速度选择比。表1中不同样品的聚丙烯酸铵的浓度包括0.2重量%和0.5重量%，而这两个值都落入了数值范围“0.1～0.6重量%”之中，因此，在对比文件1公开的浓度值的基础上，本领域技术人员很容易想到将浓度范围扩展为“0.1～0.6重量%”，从而通过浓度的改变确定不同的氧化硅层和氮化硅层的研磨速度选择比。由此可见，在其引用的权利要求13不具备创造性的情况下，该权利要求也不具备创造性。

基于上述理由，该申请的独立权利要求以及从属权利要求都不具备新颖性或创造性，同时说明书中也没有记载其他任何可以授予专利权的实质性内容，因而即使申请人对权利要求进行重新组合和 / 或根据说明书记载的内容作进一步的限定，该申请也不具备被授予专利权的前景。如果申请人不能在本通知书规定的答复期限内提出表明该申请具有新颖性和创造性的充分理由，该申请将被驳回。

审查员：戴丽娟

代码：A728

国际检索报告使用说明

1. 权利要求 3、9、15 存在不清楚的问题，因此，一通正文中在假设了这三个权利要求的修改方向后用国际检索报告中的对比文件 EP1061111 评述了上述权利要求的新颖性或创造性。
2. 权利要求 8 的附加技术特征“进而具有在上述氮化物层的表面出之前，使用具有在上述氮化物层的表面露出之前，使用氧化硅浆料，用化学机械研磨工序除去上述氧化物层的步骤”并未被国际检索报告中给出的三篇 X 类文件 EP1061111A1、EP1148538A1 和 EP1274123A1（WO01/80296A1 的同族）公开，且上述特征也不是本领域的公知常识，审查员检索到了公开上述附加技术特征的对比文件 US2002/0110995A1，用国际检索报告的对比文件 EP1061111A1 结合 US2002/0110995A1 评述了权利要求 8 的创造性。
3. 权利要求 14 的附加技术特征并未被国际检索报告中对比文件 EP1061111A1 和 EP1274123A1 公开，因此，EP1061111A1 和 EP1274123A1 无法作为该权利要求的 X 类文件。一通中使用国际检索报告中的对比文件 EP1148538A1 结合本领域公知常识评述了该权利要求的创造性。